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CAM

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345
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VOLUME 2 NUMBER 10 SEPTEMBER 1945

Your Last Copy of CAM

With this issue CAM suspends its operations as a maintenance journal of a mechanized army at war.

The 'V' days have come—and our citizen army that Canada built into a smooth and expert fighting machine, breaks step to revert to the tasks of peacetime citizenship.

The job ahead for this army is no longer only the overhaul of guns or the maintenance of gun-tractors. Now it's the building of homes and the maintenance of family cars, washing machines and radios.

Certainly a professional nucleus of soldier technicians must be maintained, but the great majority will turn to the job of peace—a job as nationally important as the one just finished.

Because CAM, in character and spirit, is a part of this citizen army it moves out with it. And not without a certain feeling of regret. If CAM managed to add a smile or a laugh with its servings of maintenance lore, the task of making a serious business easier to digest was a pleasurable one. Your response, as indicated by our well filled files of letters, is ample proof of the enthusiastic way in which the magazine was received.

In other words, writing to you guys, through CAM, was a privilege and a pleasure.

Now CAM, like the citizen army, becomes surplus to the requirements of a peacetime army.

Like many of you, CAM has finished its job.

CAM

SEPTEMBER - 1945

Vol. 2 No. 10

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TOOL SHORTAGE!

FOR years there's been a weeping and wailing and gnashing of teeth over the shortage of tools.

We listened to the moaning and groaning and for a long time and simply shrugged our shoulders. Sure there was a shortage—the cry for tools to every front in the world had caught the tool manufacturers with their plants down. But there was nothing we could do about it. Now things should be better—much better—but still we hear the familiar phase—*"TOOL SHORTAGE"*.

So the other day we sharpened up our nose, went out and poked around and found—there was no tool shortage.

Not only was there no tool shortage, but there were enough tools so that if you were a whale you could dive off the depot roof and wallow around in a sea of them.

Good tools, new tools—to fit your every need, giving the man in the field the best means possible to make his repairs. Bucketsfull of special tools, of more varieties than Heinz has pickles, to repair all vehicles from the leapin'est bug to the gruntin'est behemoth used by the artillery.

Why, any soldier anywhere, who's entitled to 'em by the scales of issue, can get the tools he needs.

CMD London has nearly everything—so there doesn't seem to be any reason why the Depots in Vancouver, Vernon, Valcartier, or Vimy shouldn't have all they need. In other words—everybody everywhere can have the tools.

Well then, from whence came the hue and cry about shortage? If there's a veritable treasure trove of equipment, who or what is preventing the field from getting in on the feast?

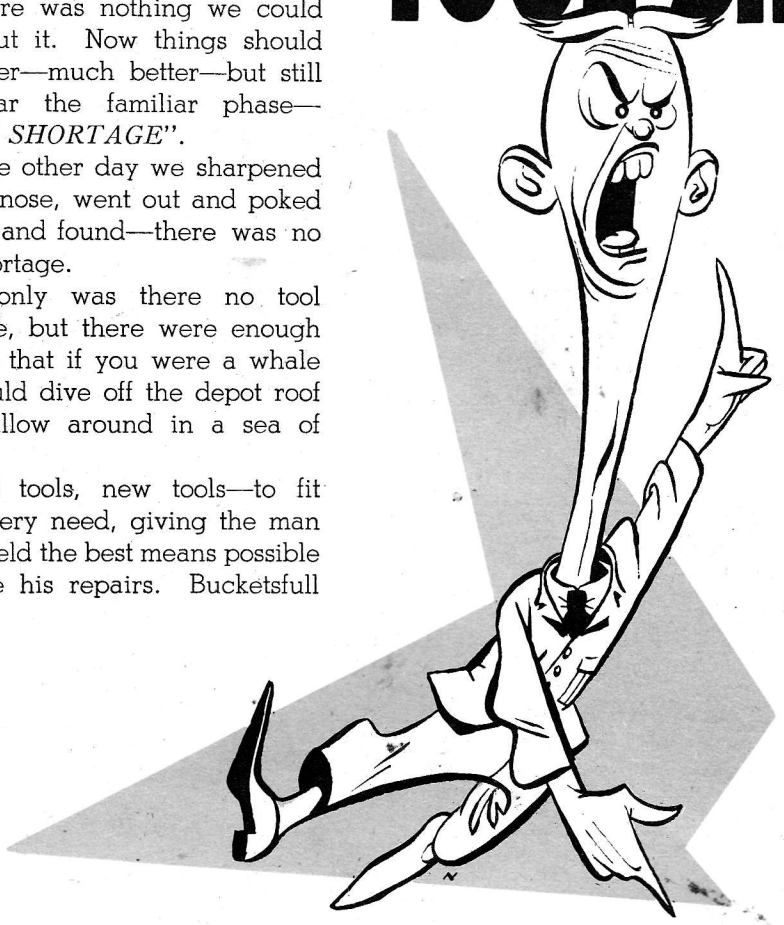
Fifth columnists? Termites? Uncle Iggy?

Uncle Iggy, there's your man—Uncle Iggy! Cherchez le rat!

Who is Uncle Iggy? Well, dear comrade, Uncle Iggy has long green whiskers, slew feet and reverse eyeballs. Uncle Iggy is none other than your old Uncle Ignorance—the little man who's usually there to get in your hair.

Uncle Iggy sits on the shoulders of clerks and helps them make mistakes. He's the guy who shows the stock keeper the nice dark corner in which to hide the package you've been eargerly awaiting.

Let's take a trip and see how Uncle Iggy gums up the works. Let's order some tools.



We take the latest issue of a tentative list of tools authorized for a workshop. Taking our requisition sheet in hand, we copy the nomenclature of the tools verbatim from the list, have it properly authorized and get it out on the double-quick.

Your poor little requisition has now been thrust out into the cold, cold world with no papa or mama to look after it. From here on anything can happen and usually does. So if you've been fortunate or foresighted enough to make the acquaintance of someone in the Supply Depot, you now write a letter asking him to keep an eye on your baby. In this way you might be able to find out when and if your requisition is to be filled.

But you can't do a thing about Uncle Iggy. Uncle Iggy, perched on the shoulders of the shipping clerks and the clerks who edit your requisition, will do his dangest to mess up the deal. He's especially adept where changing nomenclature is concerned. We mean that mebbe clerks have difficulty recognizing a new name for an old tool—or fail to recognize a new tool taking the place of an

old tool or part they've been accustomed to.

In other words, they call a spade a spade—they wouldn't recognize it if you called it a shovel, a worm turner or any other thing that might substitute for a spade.

Not having the tool you asked for and not recognizing the substitute for it, they hold up your shipment.

You wait and wait and wait and then, when your blood pressure hits 290, you holler *"TOOL SHORTAGE!"*

But supposing your requisition does get filled,—except for, say, one lonely screwdriver which happens to be scarce for the moment.

Well now, wouldn't it be wise of your O.C. to write a little billet-doux to the Ordnance Officer requesting a partial shipment of tools? Half a loaf is better than none. You nip Uncle Iggy in the bud that way. Otherwise your shipment may wait around for the missing screwdriver—and you'll be at the other end bellowing *"TOOL SHORTAGE!"*

Then there's Uncle Iggy and the mail clerk at the Ordnance Depot. For some unearthly reason, tools are continually sent to the wrong place. In all good faith, a mail clerk will aim a package of equipment at Camp Hut-Sut and by gosh it'll wind up at Ipswich-on-the Rumpus: Don't think *"TOOL SHORTAGE,"* think of Uncle Iggy.

But don't blame it all on the clerks at the Depot. The clerks in your own diggin's sometimes have five thumbs on each hand. Maybe they won't recognize a package meant for you, or an important package of tools might get stuck away on a shelf. Then when you come screaming after it like a panther, the receiving clerks have truly forgotten all about it.

Sometimes, instead of crying, *"TOOL SHORTAGE!"* friend, try keeping after your receiving clerks; let's you and the guy in the Parts Section be pals so you can needle him a bit about your supplies.

And you yourself—Uncle Iggy will get even you, if you don't watch out. When you finally receive your precious tools and are pawing over them lovingly, don't suddenly roar out *"TOOL SHORTAGE!"* because something seems to be missing. Check your scale of issue and maybe you'll find that you weren't entitled to the gadget you thought was missing. Also check and double check your original indent. Could it be that Uncle Ig made you slip up on a part number or put down an incorrect nomenclature? Sillier things have happened.

For gosh sakes, let's not be yelling *"TOOL SHORTAGE!"* all the time when something else is to blame. We must learn not to cry "wolf" until we actually *see* the wolf.

Mustn't we?

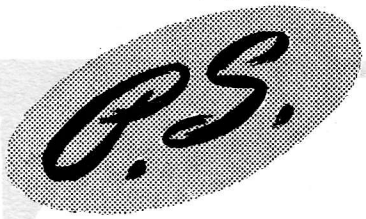
X Y Z

JUST because certain suspicious characters don't believe there's a Santa Claus—you're probably thinking that this Uncle Iggy business is just guff too. To prove different, here's a bonafide shot of part of a report actually sent in, listing a workshop's backlog of repairs to *barrack stores*. It doesn't happen to do with tool indents, but you'll get the family resemblance.

If Uncle Ig wasn't perched right on the typewriter when this was typed—we'll eat the six grills, 1 burner, and seventeen shovels, snow — axe handles and all.

How does Iggy do these things? Same way that a 4 door sedan and a chassis cleaner gets to be barrack stores—and 1 burner grills and snow shovels are held up for repair by lack of axe handles.

Anyway you skeptics—belly laugh this off!



Indent	Description of Article Repaired	Quantity	Unit	Date	Remarks
1934	Irons Pressing Tailor 12 Clps	1	"V" Group. R.C.O.C.	9 Mar 45	Waiting Element
1959	Lamps Pressing Petrol	36	"V" Group. R.C.O.C.	2 Apr 45	Waiting Burner Cage
1986	Machines Chassis Cleaning Oil fires portable 90 gal. Capacity 110 volt 60 cycle AC.	1	#2 S.S. R.C.O.C.	13 Apr 45	
,00	(Toasters Electric DND 2-003) Should be lamps Gas. 500 C.P.	1	"V" Group. R.C.O.C.	10 May 45	Waiting Burner Cage
2113	Tools Dismantling and Assembling R.F. Tires Sets	1	#2 S.S. R.C.O.C.	14 Apr 45	Being Worked on.
.14	Chest Tool NT empty Fitters Mk. II	1	#2 S.S. R.C.O.C.	14 Apr 45	Being Worked on.
2119	Padlocks Iron Galvanized	9	#2 S.S. R.C.O.C.	16 Apr 45	Being Worked on.
3156	Guns Hand Suction 16 oz.	1	#2 S.S. R.C.O.C.	12 May 45	Waiting Vulcanizer Pcs
2163	Axes Felling	1	"V" Group, R.C.O.C.	15 May 45	COMPLETED 25 Jun 45
2168	Lamps Pressure Petrol	3	"V" Group, R.C.O.C.	23 May 45	Being Worked on.
2169	Boxes Bread	1	"V" Group, R.C.O.C.	25 May 45	Being Worked on.
2170	Grills 1 Burner	6	"V" Group, R.C.O.C.	25 May 45	Waiting Axe Handles.
2189	%-/56-624 4 door Sedan	1	"I" S.S. R.C.O.C.	28 May 45	COMPLETED 5 Jun 45
2190	Shovels Snow	17	"V" Group, R.C.O.C.	25 May 45	Waiting Axe Handles
2194	Handles Brush Floor Polishing	4	"V" Group. R.C.O.C.	--	Being Worked on.
2195	Grills Electric 1 Burner	5	"V" Group. R.C.O.C.	--	Being Worked on.
2196	Machines Mincing Hand Large	21	"V" Group. R.C.O.C.	29 May 45	Being Worked on.
,9	Machines Meat and Bacon Cutting	1	"V" Group. R.C.O.C.	4 Jun 45	Waiting Instruc re Missing Motor Bread Slicer.

WRENCH ANGLE WANGLES

YOU'VE listened to the old saying, "Equipment is no better than the man who uses it." The reverse is also true. We always say, "The man is no better than the equipment he uses."

Every so often we hear of ways and means whereby tools, already in the field, can be bent, ground, filed or twisted to make them do more work with less effort. Here's a few examples of what we mean. Take a close look and if you see any old friends among them—you might well take a few minutes to make them a little more ambidextrous.

Socket Wrench Fix for R975 Engines

C.A.L.E.M.E.I. Tracked Veh. J014 Inst. No. 3 tells you that valve-clearance adjusting-screw nuts on Continental R975-C1 tank engines should be torqued at 800 to 900 inch-lbs. (65 to 75 ft. lbs.). That means you need a socket wrench.

But by now you've probably found out you couldn't even get a paper socket over some of those nuts. No room—the rocker-box wall gets in the way. Now, since the C1's have been changed over to the locknut-type rocker arm, you usually have to be three-quarters of a pretzel to *look* at the top of the nut, let alone get a socket over it.

Here's the answer as the U.S. Army Motors magazine tells it. And any hacker can do it. Just grab a healthy hacksaw and make two cuts in the wall of a standard 15/16" socket: one straight across the socket, ½" deep and ¾" from the bottom of the socket; the other a slanting cut starting ½" down from the first cut and going straight up to the bottom of it. Then file 'er down—put a little chamfer where you need it—finish it so the slot you've made will easily clear the rocker-box wall (Fig. 1).

This home-made, air-conditioned tool takes only twenty minutes to turn out and should save you a couple of hours on each job. Only other way you can put that kind of torque on a nut that's crowded against the rocker wall like that, is by rotating the engine until the push rod pushes the rocker up so the socket can reach the nut. That means you have to turn the engine over again to find out whether actual valve clearance is what it should be. You may have to run through the whole routine eight or ten times before the adjustment's correct.

So if you've got your back against a rocker-box wall, don't give up—just carve yourself one of these new tools and smile, smile, smile.

Brake Anchor Pin Adjuster

ADJUSTING the front brake anchor pins on Fox and Otter Armoured Cars is easy as falling off a fender. That is—until your adjusting wrenches tangle with each other and the steering arm. When that happens you can't blame a guy for wanting to sink his teeth into the sidewall of the nearest tire.

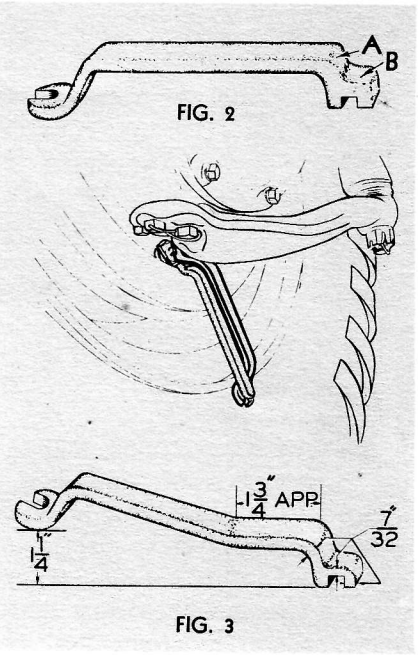


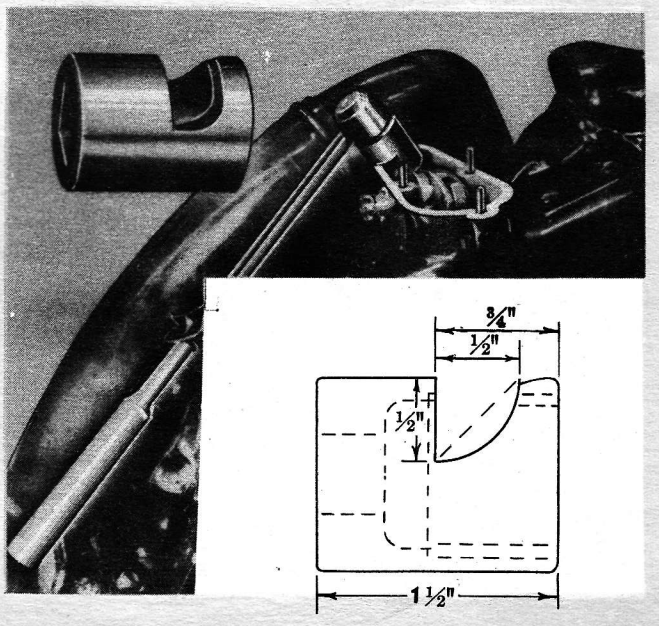
FIG. 2

FIG. 3

A little bending and filing will save all this teeth gnashing and exaspiration. Take adjusting wrench X-2027B (Fig. 2) off in a corner. Heat it to a dull red and bend it so it looks like the one in Fig. 3. Wind up by grinding the end at points "A" and "B" so its thickness is 7/32" as shown.

Then you'll agree; adjusting the front brake anchor pin on these vehicles is easy.

(See next page)



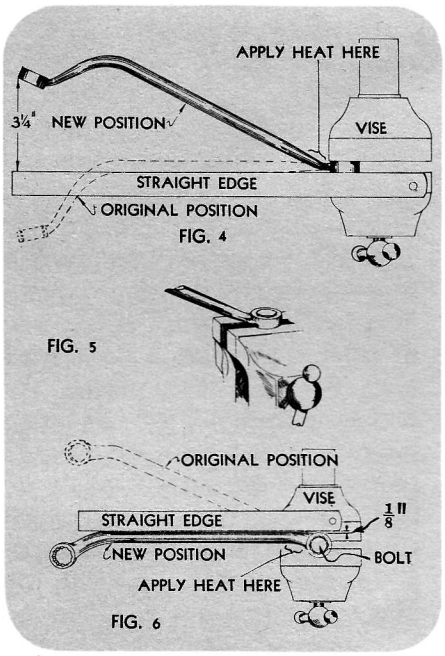
Any hacker can follow the working drawing and scoop out a standard 15/16" socket—like the one shown here going into action on that tucked away tappet nut.

FIG. 1

Harley Cylinder Base Nut Wrench

MOST Harley hep-cats are as conscientious about their machine as a lance jack at basic training. Except when it comes to checking certain cylinder base nuts on their murder-bikes. This is where they turn a blind eye. Ordinarily we'd be the last to blame them for skipping this item when they're checking their machine for tightness, because the standard wrench in the kit of hand tools that fits the base nut won't get at it—and trying to work it 'as is' often causes both loss of knuckle meat and cylinder fins.

It's a strong minded guy that's going to pull the generator just to check the base nut. Not even if he knows that it's possible for the nut to loosen or drop off and cause ructions with the cylinder crankcase and oiling system.



However, if he's as conscientious as we think, he'll take this same little wrench, (part number 12650-29) and bend it so it will do the job pie-easy.

All he has to do is heat it (not more than a dull red) and bend it according to Fig. 4. That done he places a bolt in the vice with its head projecting above the vice jaws and fits the wrench on it as in Fig. 5. Now he heats it the same as before and puts another kink in it, like you see in picture number six. Let it cool by itself and he's cooked up a means of getting at that out-of-the-way, but important cylinder base nut.

X Y Z

MIKES and BUZZERS

SHORTY Sirkit, who normally has no respect for time (or age unless it's bottled), tells of two time saving ideas in his scented note to us this month. Both have to do with telephones and switchboards and are guaranteed to give you extra man-hours to spend on the better things in life.

Here's how. Suppose you find that you can't transmit speech from a switchboard or a telephone. What's the first thing you do? Right—you check the hand unit by means of an ohmmeter and find that there is continuity and everything in the hand set seems to be working O.K. So you decide that something must be astray in the switchboard itself, and spend the next day or two checking and tracing the wiring and works. Finally you come to the conclusion that everything is O.K. there too. Little man, what now?

Put away your Spicy Tales magazine, carefully erase the N.W.C.R. you wrote on the set and grab up the hand unit again. Sure it was the first thing you checked—and it seemed O.K. but ten chances to one that's where the trouble is.

A fault called 'packing' is fairly common in carbon microphones. It is the sticking of the carbon granules, and the remedy is either tapping (do not use a blunt instrument) or shaking the mike. If this doesn't produce a cure, the capsule must be removed and repacked with new granules.

Still with the idea of time on his hands, Shorty gives his second vote to the adjustment of buzzers as being most likely to succeed in using up the clock.

Taking for granted that you won't try adjusting a telephone set buzzer without making sure that the battery voltage is correct, points clean and everything is up to mechanical snuff, Shorty maps out the following procedure as being the shortest route.

Connect an A.C. Voltmeter, using a low range, to the output terminals of the buzzer and loosen off the two adjusting screws about six turns (he repeats *six*—and no more). Turn in one screw, *not both*, until a tone is heard and a small indication is seen on the meter. Now turn in the other screw and a greater indication should be obtained on the meter—then alternately adjust both screws until maximum indication is obtained—and this is it. You should have a reading of about 23 volts.

Main thing to remember is, after turning *both* screws out the six turns, *only one* is turned in to obtain the initial tone. If you start monkeying about with both screws at the start, you can play till the cows come home and not obtain the initial tone.

As Shorty says, it's all a matter of time.

X Y Z

MYSTERY OF VEHICLE PARK

OUTSIDE, the September full moon shone down on a group of shadowy forms clustered around a lone building. These were once strong silent vehicles, ready to move at the jump of a spark. Now they were weaklings—hardly capable of pulling their own weight up a 20 percent grade.

Inside the building an equally silent group of mechanics huddled around one lone vehicle. At the stroke of midnight they were to witness a post mortem that would reveal the identity of the horse-power thief.

Only a few minutes to wait and the best brains in the district, Sgt. Sherlock Jones, by name, would make an appearance.

As the seconds ticked by, the atmosphere became even more tense and death like. Then, at exactly one second before 2400 hrs., the tall figure of Jones entered. Without a word he ran deft fingers over the bumper, the radiator, the cylinder head, ah! there his fingers paused momentarily, then continued till they had gone over every square inch of the vehicle.

After that there was a few minutes of questioning. Yes, the correct oil was being used, the tappets had been checked and double checked, compression had been tested, etc., etc. Everything, according to the mechanics, was right, they would swear to that.

Jones whipped a metal object from his pocket. What was it? Could it be—why, yes, a torque wrench. He measured the tension of each of the cylinder head nuts in turn. Then he did a strange thing. He sent Cpl. Blotsom, (who had been breathing down his neck), to the tool crib to get the torque wrench that was originally used on this cylinder head. "This," said Sherlock, after he had tried out the wrench, "this is unquestionably the cause of the trouble. Your torque wrench is inaccurate. Every vehicle in the unit is undoubtedly running around with its head (and other components) torqued incorrectly."

The group of mechanics stared in wonderment. "How," queried the Corporal, "did you know that was the trouble?"

"Elementary," my dear Blotsom, "similar cases have come up before, not only with torque wrenches but other tools, such as tire gauges. The solution, of course, is to periodically check these tools that you depend on day in and day out for absolute accuracy. Compare them with a gauge of known accuracy. In the case of the torque wrench, if you haven't got one that you are positive is accurate, you can always get a suitable spring tension scale on local purchase. Then you'll have a means whereby the wrench can be checked at least every thirty days. The cost of a spring tension scale is of little importance compared to the damage that can result from an inaccurate torque wrench."

"To test the wrench, clamp the drive end in a vise. Next, hook the spring scale on the wrench handle twelve inches from the drive end. Then when you pull on the spring scale the same reading in pounds should register on both gauges."

"Tire pressure gauges," went on Sherlock, "take even a worse beating than torque wrenches. They get banged around a great deal, especially if left loose inside vehicle tool boxes. The result is that a great many are not reading correctly. Just constant use will eventually make them inaccurate. Every vehicle is supposed to have a tire gauge. There is no excuse for it not having one because there is certainly no shortage of them in the army stores. Every unit, no matter how many vehicles they have, should also have **one** tire gauge that is known to be accurate. This gauge should only be used as a master gauge to check the others. Handling it with care at all times will keep it accurate. It is essential that all tire gauges be checked at least once every week. Any gauges that are out more than two pounds should be turned in for new ones."

So saying, Sgt. Sherlock Jones strode to the door sucking hard on his pipe and a moment later vanished into the night behind the wheel of his jeep.

X Y Z

Delirium T. Rowdy (our S.A. ferret) digs up a couple of pluguglies from Kizel's mind area.

THERE is the sound of a muffled shot about nine o'clock the other evening and Kizel, on hearing it, buries his head a little deeper in the sandbag the army issues him for a pillow and groans gently to himself. Now this is not a hangover groan, nor yet is it the groan of an uneasy conscience, so being intensely curious as to what else in this world could make Kizel the Weird groan in such a manner I take out my vacuum gauge and proceed to read his mind. Reading Kizel's mind is no mean feat, I assure you, as it is very small and becomes easily lost in his size 7¾ dome; but I eventually do find it sitting on a soap box over by his left ear. It is fortunate I find the Mind when I do because it is just commencing to mutter as follows:

"Boss, that was a shot. Boss, that was a muffled shot. Therefore it follows that it is not a character polishing himself or his neighbour off. The only other thing it can be is some noble person blowing an obstruction out of the bore of his rifle with a live round."

"Now Boss," continues M, "if the citizen who does this dastardly deed has enough savvy to take the bullet out of the round before firing it you will only have the small job of replacing a bulged barrel, but if he did not remove the bullet you will have a blown up rifle on your hands."

"Let me see, boss, this will be the third already this month. The first was an ex-jockey who used a chunk of horse blanket on his pullthrough and got it stuck tighter than the odds on a straight race. He didn't take the bullet out before trying to blow the obstruction out of the bore and now he won't ride another horse until they build them with foot controls."

Kizel's Mind climbs up to the top of his head and sits down on a hair root, saying all the while: "The second occurrence of this nature this month happens when a hardy soul, who has his pullthrough broken off in his barrel, tries to blow it out with a round from which he first removes the bullet. This incident is not so bad as it only gives you, boss, a couple of hours work and costs the character a few days pay for a new barrel."

"But," continues the Mind, "you could save yourself all this work, boss, if only you would start a programme of prevention through enlightenment; see that the men are taught that clearing rounds, properly prepared, might be O.K. for some types of machine gun with very heavy barrels but are almost always bound to bulge a rifle barrel. Or better still you could have it whispered in every soldiers' pinky ear that the proper size of 4 x 2 flannelette on the regulation pullthrough will not stick in the bore and will still efficiently clean the barrel if done promptly after firing and often between shots."

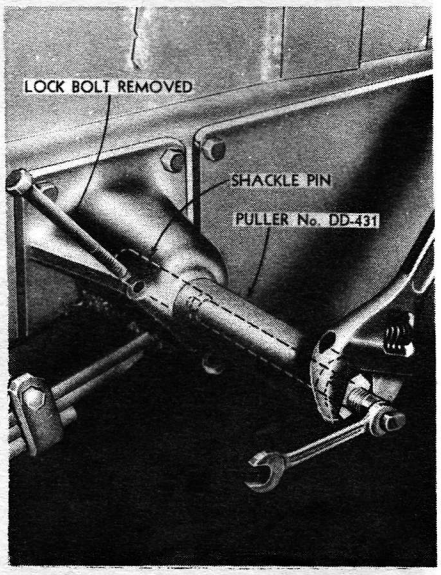
"You yourself, boss, might set up a P.A. system in the wet canteen and tell every man that, if he does get his shirt tail jammed in his rifle, you have just the tools required to cleanly and efficiently remove it without damaging the rifle and to fer cripes sake leave the thing alone until he can get it to you and have it done."

To emphasize what it is saying the Mind stamps its foot hard a couple of times, at which Kizel swears loudly and wakes. With which his mind promptly curls up in a corner and goes to sleep—confirming my worst suspicions.

X Y Z

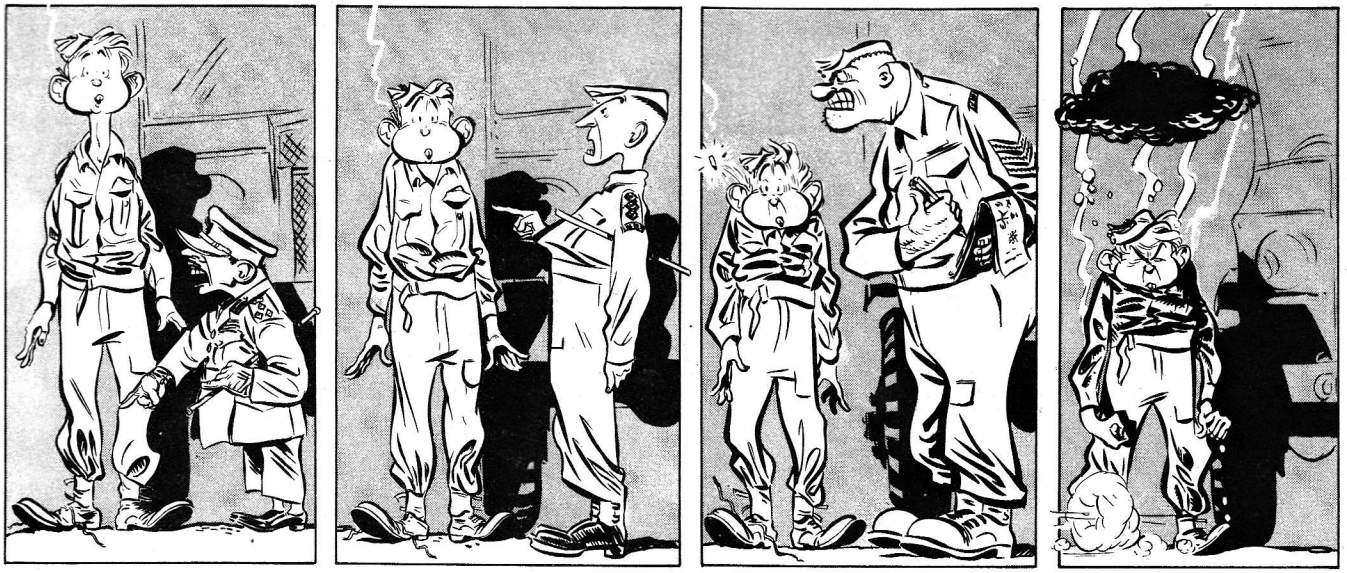
Dodge Shackle Pin Puller

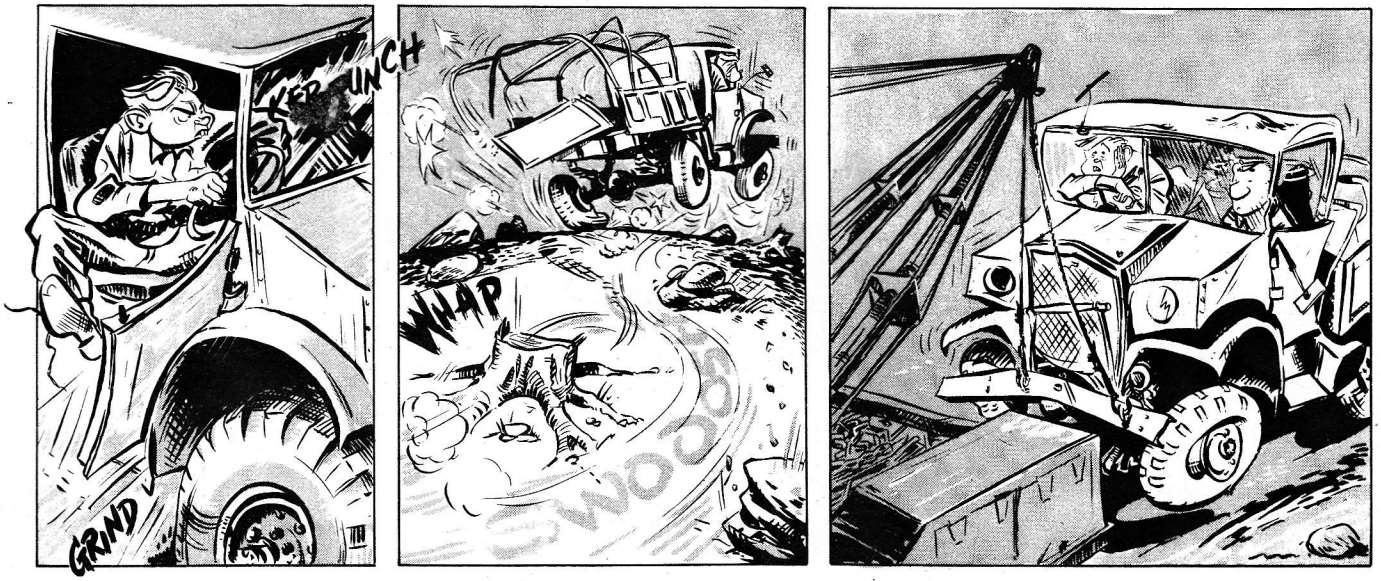
YOU asked for it so now you got it. This little puller wasn't included in the scales of issue of workshop tools for a long time. When friend Crafty wanted to pull the headless shackle pin bolt on a Dodge army vehicle he couldn't without going to a lot of trouble. We heard his wailin' all the way down here—so now puller, (part number DD-431) is on the scale of issue. Crafties all over the place will be happy to know that they merely need to ask for it to get it.



The Cam-Pains of Benny Boob-

The plot:
Benny catches hell.
Benny burns—he'll show those soansos.
Benny can't take it out on the Sarge or the Brass—but he sure can show that truck who's who!
Benny feels better. The truck now knows that he can dish it out too. His ego is restored.
Stupid? Asinine? Extravagant? Sure!
Benny will get around to figuring that out too some day.





For B.F.s Diddling . . .

WHILE the title to this story may sound quite harmless, the phobia, complex or disease known as diddling can, and often does, result in quite serious after effects—both to the diddler and to the diddlee.

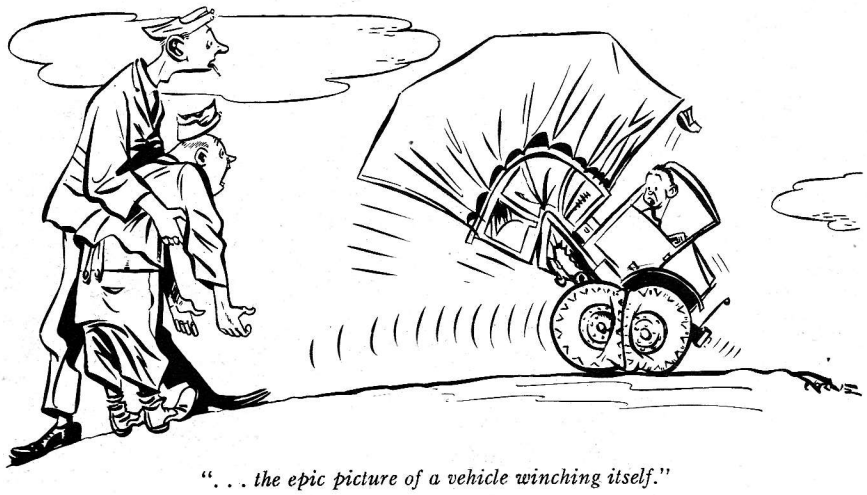
Exempli gratia (or, as they say in the army—e.g.). Let's say you're a B.F.—remember, this is just a story—and you are sitting in the cab of a parked military pattern vehicle, just waiting while Joe runs into the U. Garage with the Sarge's wet wash.

Then and there is created the set of circumstances so peculiarly conducive to diddling. You are alone with all the knobs, buttons, switches, and levers. You twitch. For a moment more you just twiddle. Then, being a B.F. it's no time at all before you're diddling.

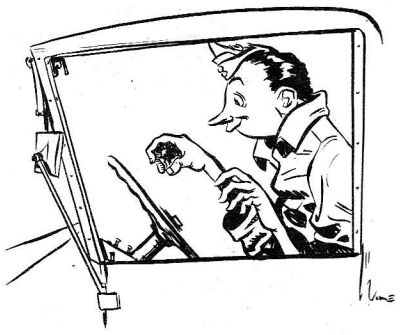
Let's start by taking your right foot. Perhaps we should have said, let's take it right away from that gas pedal which it is so busily pumping up and down—for it's hooked up with a gadget in the carburetor known as an accelerator pump.

Normally, the accelerator pump's job is to squirt an extra shot of gasoline to the engine when it needs it for rapid acceleration. But pitter-patting on the pedal when parked with the engine not running, only pours raw gas into the manifold and combustion chambers, washes the oil off pistons, rings, and cylinder walls, dilutes the crankcase oil, and generally plays hob with the engine's innards the moment it's coaxed into starting.

Meanwhile, what's a B.F. to do with an unoccupied hand? Ah! Those gear shift and transfer case levers. Let's see, you say, here's low—here's front axle engaged—this must be high or somethin'—or winch mebbe . . . all very interesting, of course. You're happy! You're diddling!



". . . the epic picture of a vehicle winching itself."



". . . alone with all the knobs, buttons, switches and levers."

But w[illegible] Right up next to you is a big steering wheel. Can you, as a self-respecting diddler, afford to pass up a steering wheel? No, Sir. Not when a good hefty heave can turn it every which way, and who says you can't rise to the occasion with a good hefty heave. Unfortunately — the steering gear of the vehicle doesn't always follow suit. With no forward motion to *roll* the wheels they have to twist against the tire's grip on the ground. What this does to the steering linkage, shafts and rods is, for all intents and purposes, roughly the same as the Sergeant threatens to do to you as he suddenly appears on this scene.

But his wrathy words can be classified as merely the calm before the storm—when he climbs into the cab, starts the motor—and tries to drive off.

Remember that transfer case shift lever? Tska tska—you left it in the winch power take off position. You are now confronted with the epic picture of a vehicle *winching itself.*

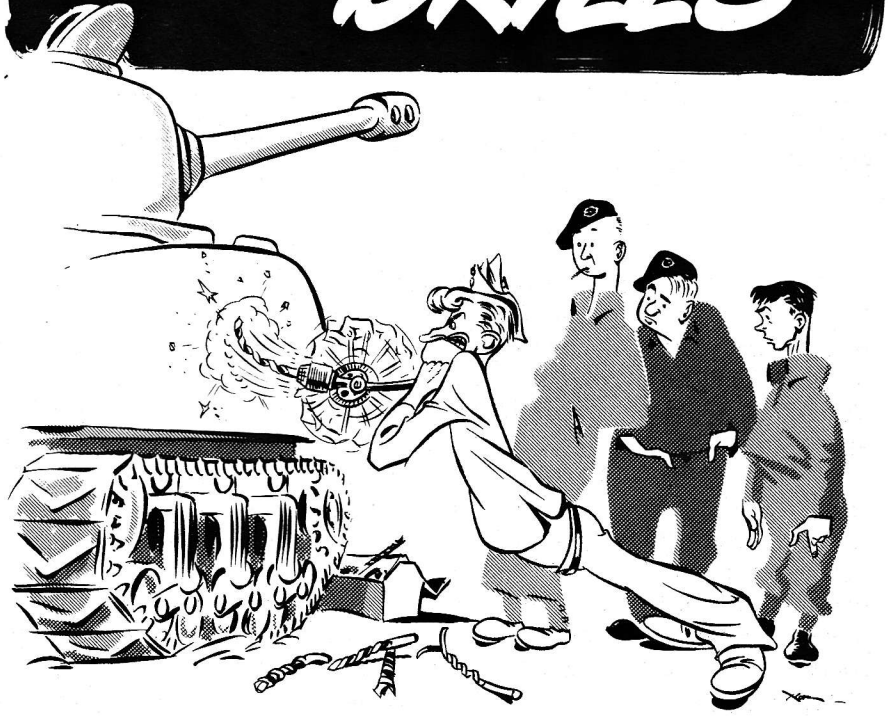
Ponder this touching scene, while we add the sound effects of tearing metal, snapping cables, straining mounting bolts and uprooted anchor hooks.

And finally, may we quote. "'Twas easy to reason why. 'Twas but to do and die—some B.F. had diddled!"

X Y Z

If drilling holes gets your nerves on edge . . . .

Get the edge on DRILLS—

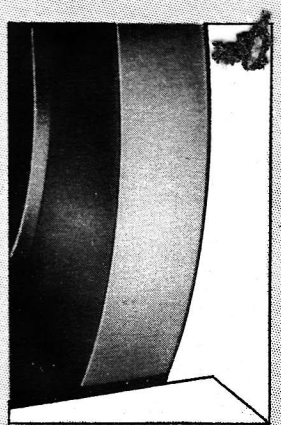


IT'S O.K. to say that no army nut-busters need worry about sharpening up their drills—all they hafta do is turn them in to Spare Parts for a new one. Which is normally swell—if you've got the normal time, if a normal Spare Parts have the exact drill size you want, if Spare Parts are as handy as they normally are.

But what about Joe N. Buster sitting in one of those abnormal circumstances so common to the army—with a very important hole to get drilled—and a drill that wouldn't cut a deck of cards. Joe's going to have to sharpen his drill.

Sure, it's a ticklish job without a proper holding jig. Sure, it requires a bit of skill and practice—but mostly it's a case of knowing what is needed to make a drill cut—and how to make the most of what you've got now, without waiting for the situation abnormal to arrive.

Some guys are beat from the start. They try to use a grinding wheel that hasn't got a flat face. No one, not even an expert can expect to get good results from a grinding wheel with a groove on its face. (Fig. 1). So one of the first things to do is true the wheel. And when you don't have a special truing tool you just wear the face flat with a piece of scrap metal or a chunk of fire-brick.



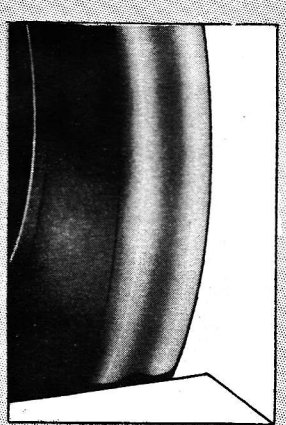


Fig. 1. Dressing a drill on a grooved wheel ain't funny — you got to keep a straight face.

Even a well trued grinding wheel isn't going to do a good job if it's not the right type for sharpening a drill. A coarse hard wheel is no good. What you want is a soft, medium grained wheel. It's not only easier to use but does a much better job with less danger of overheating the drill point.

Overheating, as you likely know, is not good for drills at anytime. Overheating tends to soften the point so that it dulls faster. That's why oil is applied to the work when drilling a hole. The oil reduces the friction which is the cause of overheating. After

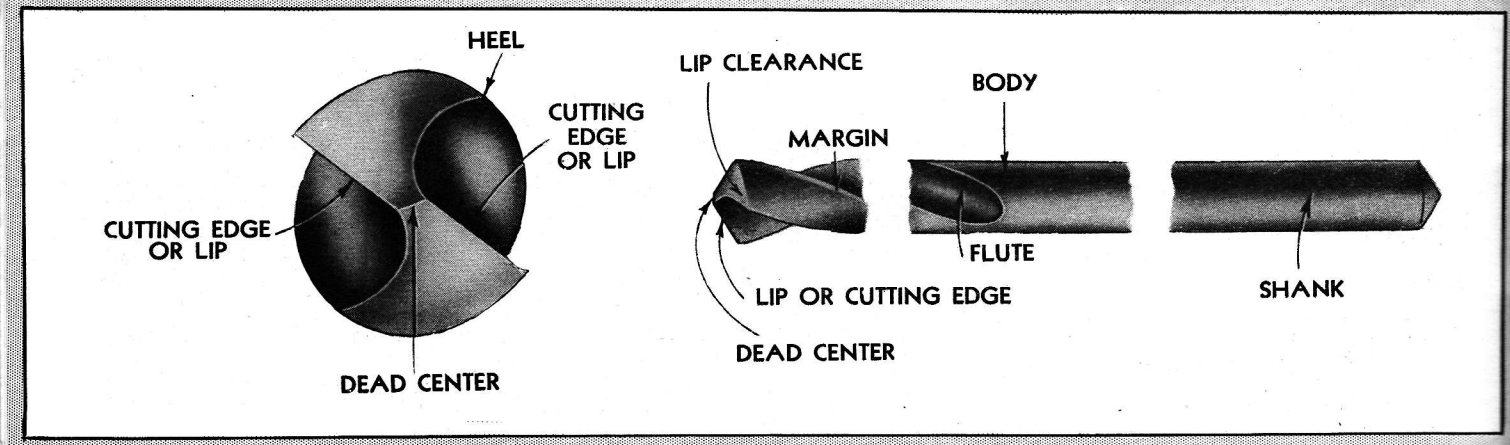


Fig. 2A . . . a name for every edge and corner. Know the names and you'll know what we're talking about. Fig. 2B

all, it's not the friction that cuts the hole, it's the two sharp cutting lips on the point that shave the metal off. Overheating while sharpening is just as bad. That's why you can take your time, take it slow and easy so the point won't overheat. If it does get too hot, don't quench it in water or oil. Let it cool off by itself so that the even texture of the metal and as much hardness as possible will remain throughout the point.

Fig. 2 names the parts of a drill. You might also note the factory sharp point on it. When you can produce this kind of a job you're tops and need salute Sergeants on Saturdays only.

LIP CLEARANCE

This is probably the most important of the four features on a sharp drill. In Fig. 2A you'll see the drill's two cutting edges. Each edge is like the cutting edge of a knife or a chisel; they shave off the metal. Naturally they have to be sharp. The *lip clearance* or taper if you like, see Fig. 3, forms the cutting edge, just like the taper on the edge of a knife blade, a razor blade or a chisel. On a drill, this angle has to be 12 to 15 degrees. If the angle is more than that the cutting edge will be weakened and it will dull quickly. If the angle is less than 12 degrees it will be dull from the start.

POINT ANGLE

The second point in drill sharpening is to obtain the proper angle of the two edges which form the point. (Fig. 4).

With cutting edges ground to different angles only one edge will do the cutting—and the hole will be oversize.

Besides having them at exactly the same angle, you'll have to consider the type of material you're going to use the drill on. As a general rule, the softer the material the steeper the point angle. For general work an angle of 59° (total angle 118°) is about right. Hard material, such as manganese steel will need an

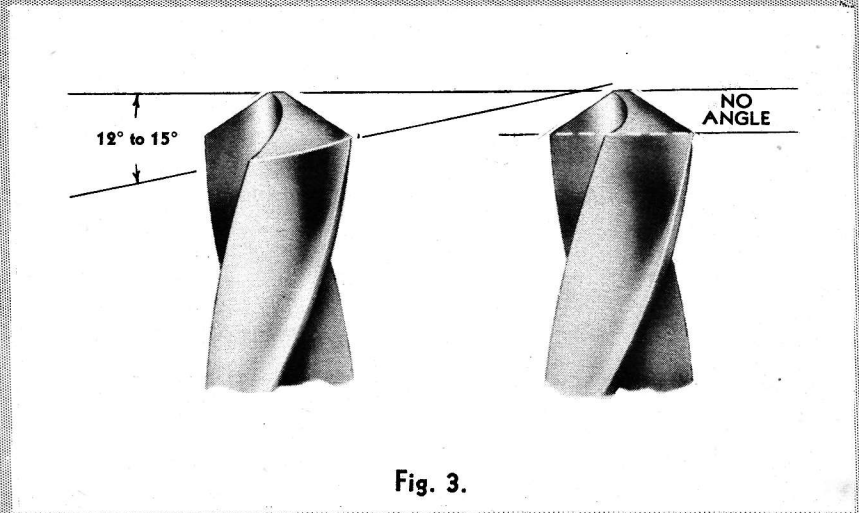


Fig. 3.

Correct lip clearance results in a nice sharp cutting edge.

No lip clearance—No cut. All this drill will do is get hot and distempered.

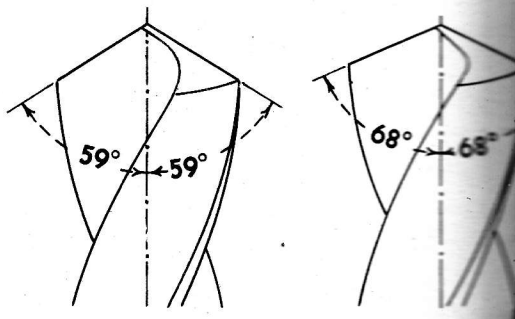


Fig. 4. The right slant is particularly i softer the material you're going to d point angle.

angle of 68° (total 136°). Wood, fibre and other soft materials can be drilled best with a steep angle, say about 30° (total 60°).

Maybe you got 20-20 vision, maybe you can hang a picture straight without using a yardstick but without a lot of practice it's pretty hard for your nude pupil to tell 118 degrees from 136 degrees on a drill point. That's why it's easier and safer to make a jig or template out of a piece of sheet metal like the one in Fig. 5. Measure the angle exactly—(the boys in the draughting department will measure it for you) then hang the guide jig on your grinder. If you make more than one guide so you'll have the different angles, so much the better. Using the guides you won't have anymore lopsided and wrong angled drills. You, my boy, will know all the angles.

CUTTING EDGES

The third little item also has to do with the edges that do the cutting. It's possible to get the right point angle on both edges but at the same time get one edge longer than the other. This means that one edge will take a larger cut, putting an unequal strain on the two cutting lips. This also means the hole will be oversize.

Your guide to this is the centre point, or chisel point, of the drill, (Fig. 6). The point, while it isn't really a sharp point, must be in the centre. How sharp it is comes under the heading of point thinning.

POINT THINNING

A properly thinned point is the fourth feature a drill needs. Unfortunately this is a job that can't be done without special equipment. When a drill gets to the stage where this is needed you've no choice, you have to pass it in for replacement. The web at the point should be no wider than one-eighth the diameter of the drill. Take a look at a new drill or another glance at Fig. 7 and you'll find the web is tapered. It's narrower at the point end than it is closer to the shank.

Logic will tell you that after the drill has been shortened by repeated sharpening, the web will be wider at the point. So when excessive pressure is required to make the drill penetrate, and you can see that the web is too wide—

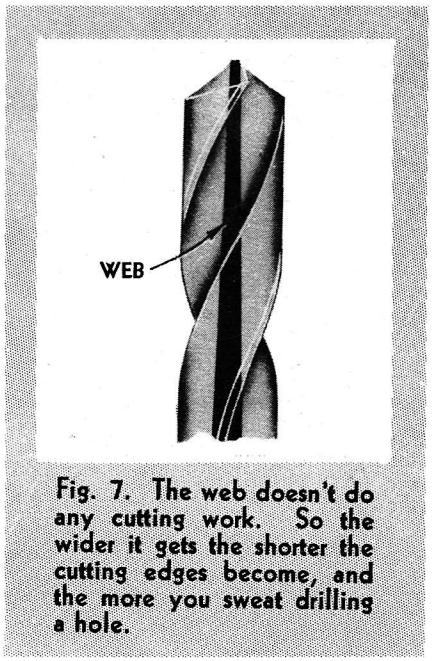


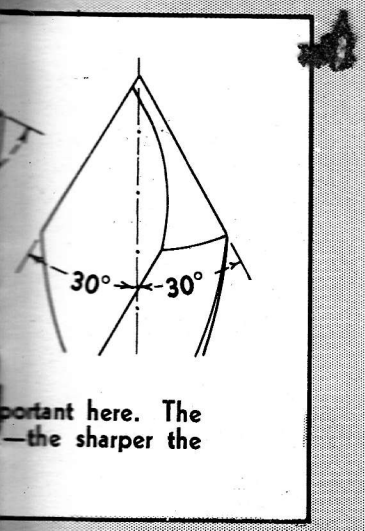
Fig. 7. The web doesn't do any cutting work. So the wider it gets the shorter the cutting edges become, and the more you sweat drilling a hole.

you'll have to get a new drill.

A drill can be sharpened a lot of times before point thinning becomes necessary—so try doing it yourself. One of these days you may be glad you learned how.

X Y Z

P.S. For safety's sake—first, last and always—wear goggles so you'll be able to use the danged drill when you do get it sharpened.



portant here. The —the sharper the

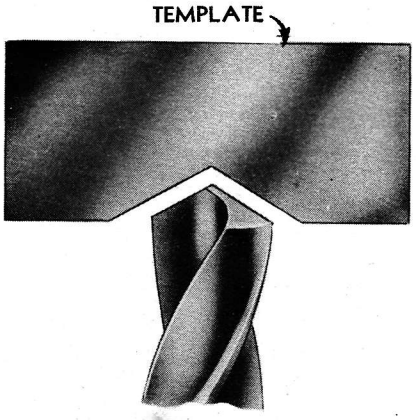


Fig. 5. Using a template as a guide and you can't miss getting the right angle.

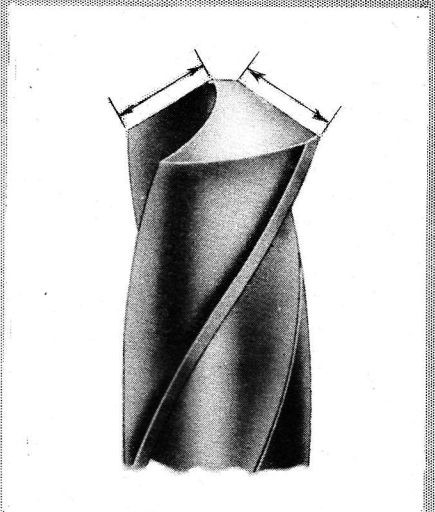


Fig. 6. Each cutting edge must be the same length in order to split the work evenly and make the right size hole.

Welding Cast Iron

Dear Sgt. O'Sweat:

Not long ago I read someplace that old cast iron piston rings could be used instead of welding rod when welding cast iron. I've tried it out on a clutch housing and found it worked out fine. What do you think of the idea?

Cfn. S.F.

Dear Cfn. S.F.:

I think it's a thrifty idea—besides being very handy if you run short of the standard cast iron welding rod.

The best way to use them would be to gather up a bunch of old compression rings and clean off all the oil and dirt. Then break them into short pieces and weld them together to form a rod. I wouldn't use oil or scraper rings though because they're too oily and dirty—just use the compression rings and make sure they are cast iron.

O'Swlat

Poor Welds on Shock Links

Dear O'Sweat:

Have you had many reports of shock absorber links breaking off? At this camp we have run into several cases of the links coming apart at the weld. So far the trouble has been confined to 30 cwts. and 60 cwts.

Perhaps you are in a position to hand out a few aspirins to this headache because we are getting tired of having to install new shocks on our vehicles.

S.Q.M.S. F.B.D.

Dear S.Q.M.S. F.B.D.:

You can quit installing new shock absorbers anytime now, Quarter. Else, one of these days Spare Parts will be fresh out of shocks.

It seems G.M. got this headache too and for some time now have been testing the welds before the shock links leave the factory. According to them, some shocks got out with weak welds but these can easily be rewelded if they break in service. You can electric weld them or acetylene weld them—as long as you do a good job.

Before welding you'd better remove the ball and bushing assembly. This can be done by pressing them out, using a sleeve or piece of tubing slightly smaller in diameter than the bushing which holds the ball. Do your welding then press the assembly back in place and restake it. Better not stake it at the same spots it was staked before or it may not stay in position.

How many more shocks will break is hard to say but there's one thing I know—a good weld will fix them so they're better'n new.

O'Swlat

Dodge Spring Bolt Locks

Dear O'Sweat:

Why isn't there a lock of some kind to prevent the front spring bolt from loosening on the ½-ton Dodge pick-up?

We've found that the spring bolts on these jobs loosen by themselves and get out of the spring bracket.

Cpl. R.P.

Dear Cpl. R.P.:

My book says there is a lock washer for these spring eye bolts and calls it part number 618192. This same washer is used on the DD-2 Dodge, 1-ton. Of course, I ain't sayin' the washers couldn't have been left out at the time these trucks were originally assembled or during an overhaul.

Maybe you better check all your ½ and 1 ton Dodges. If you find any front spring eye bolts minus lock washers, all you gotta do is ask for them—and see that they get fitted.

O'Swlat

Coil Design Change

Dear Sgt. O'Sweat:

I thought I had a pretty fair knowledge of ignition coils and how to test them but not long ago I got fooled.

Most coils have one end of their secondary winding connected to the primary winding. If you want to find if the secondary has an open, you connect one tester clip to the primary terminal and the other clip to the high tension outlet. Naturally you expect to find a complete circuit if the secondary winding is good.

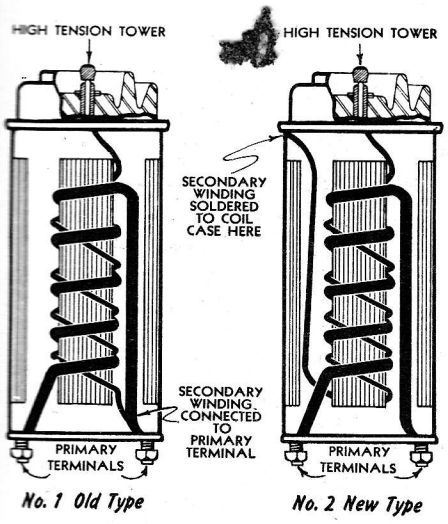
I've run into a few Delco Remy coils lately that can't be tested this way. First I thought the coils were no good but then I discovered that the secondary wasn't connected to the primary at all. Instead, the secondary winding is soldered to the metal case of the coil.

Maybe you can tell me why some coils are made like this and what vehicles we are likely to find them on.

Cfn. D.M.F.

Dear Cfn. D.F.M.:

You're right as rain in saying that some Delco Remy coils are wired differently. From the outside, the coils look like twins—so I've shoved in a picture to show the difference in the internal hook-up. The reason for the change is to reduce radio interference.



No. 1 Old Type *No. 2 New Type*

At the moment I can't tell you which vehicles have the new type coils or which have the old. However, I do know you may find the Fox and Otter Armoured Cars equipped with either types as the change was made during production. Delco Remy equipped American vehicles may also have both types of coils. The rules for testing the two types are different so here's what you'll need to know.

Coil number one, being the standard type, should have a *closed circuit* between the high tension outlet and either of the primary terminals. Coil number two should have an *open circuit* when the same test is made.

Coil number one should have an *open circuit* between the high tension outlet and the case of the coil. (Scratch off a bit of paint to get a good connection). Coil number two should have a *closed circuit* when making this test.

Another difference crops up when heating the number two type with a coil heater. Connect a jumper wire between the high tension outlet and the coil case. If you don't the internal insulation may break down from the induced voltage set up in the secondary winding.

Other than that there's not much to worry about—except to remember that coil number two won't work on the vehicle unless it's case is grounded.

O'Sweat

SACKED

Looks like there's going to be a pause in our beautiful friendship. Together we've had a lot of fun kicking ideas around, and between us we've helped a lot of guys out of trouble on every front in the world where Canucks have been fightin' and fixin'.

It's been swell knowing you jokers and being able to share your ideas and headaches. But this being the last issue of CAM I'll hafta blow. So I'll say thanks and good luck.

O'Sweat

Jeep Manifold Valves

Dear O'Sweat:

I've run across a lot of Jeeps that have their manifold heat control valves installed wrong.

There must be a lot of army mechanics who don't know that the spring should not be hooked under the spring stop. The loose end of the spring should rest on top of the spring stop, not hooked under it.

Don't you think it would be an idea to tell everybody about it?

S/Sgt. E.P.

Dear S/Sgt. E.P.:

Ain't that somethin! I guess the boys who do this don't know that if the loose end of the bimetal spring is hooked *under* the spring stop the valve won't open.

This is O.K. for starting but once the engine runs for awhile it's K.O. With the valve closed, the hot exhaust gasses are directed around the intake—regardless of engine temperature. This bumps the incoming fuel mixture's temperature too high—expands it so that the engine gets a weak ration of air and fuel. Result—high temperature, pinging, loss of pep, power and performance.

By all means let's let the spring ride atop the support like you say, Staff.

O'Sweat

Resistance Value

±5%			±10%			±20%		
10	1000	100000	10	1000	100000	10	1000	100000
11	1100	110000						
12	1200	120000	12	1200	120000			
13	1300	130000						
15	1500	150000	15	1500	150000	15	1500	150000
16	1600	160000						
18	1800	180000	18	1800	180000			
20	2000	200000						
22	2200	220000	22	2200	220000	22	2200	220000
24	2400	240000						
27	2700	270000	27	2700	270000			
30	3000	300000						
33	3300	330000	33	3300	330000	33	3300	330000
36	3600	360000						
39	3900	390000	39	3900	390000			
43	4300	430000						
47	4700	470000	47	4700	470000	47	4700	470000
51	5100	510000						
56	5600	560000	56	5600	560000			
62	6200	620000						
68	6800	680000	68	6800	680000	68	6800	680000
75	7500	750000						
82	8200	820000	82	8200	820000			
91	9100	910000						
5%			10%			20%		
100	10000	1.0 Meg	100	10000	1.0 Meg	100	10000	1.0 Meg
110	11000	1.1 Meg						
120	12000	1.2 Meg	120	12000	1.2 Meg			
130	13000	1.3 Meg						
150	15000	1.5 Meg	150	15000	1.5 Meg	150	15000	1.5 Meg
160	16000	1.6 Meg						
180	18000	1.8 Meg	180	18000	1.8 Meg			
200	20000	2.0 Meg						
220	22000	2.2 Meg	220	22000	2.2 Meg	220	22000	2.2 Meg
240	24000	2.4 Meg						
270	27000	2.7 Meg	270	27000	2.7 Meg			
300	30000	3.0 Meg						
330	33000	3.3 Meg	330	33000	3.3 Meg	330	33000	3.3 Meg
360	36000	3.6 Meg						
390	39000	3.9 Meg	390	39000	3.9 Meg			
430	43000	4.3 Meg						
470	47000	4.7 Meg	470	47000	4.7 Meg	470	47000	4.7 Meg
510	51000	5.1 Meg						
560	56000	5.6 Meg	560	56000	5.6 Meg			
620	62000	6.2 Meg						
680	68000	6.8 Meg	680	68000	6.8 Meg	680	68000	6.8 Meg
750	75000	7.5 Meg						
820	82000	8.2 Meg	820	82000	8.2 Meg			
910	91000	9.1 Meg						
		10.0 Meg			10.0 Meg			10.0 Meg

From a story by a different name in Australia's AEME NOTES.

CAM

IF you've been neglecting your Saturday afternoon visits to Slugsie's Pinball Parlour, to sit at home and wonder about the odd values of some composition fixed resistances used in Army wireless sets, go puzzle no more. Here's the story.

Once upon a short time ago fixed resistances were valued 500-ohms, 50000-ohms, 70000-ohms and so-forth. Now you see 470-ohms, 47000-ohms, 62000-ohms and so-forth. In most cases the circuit will work just as satisfactorily with 5000-ohms in place of 4700-ohms, or 2000-ohms in place of 2200-ohms. What's the idea? Why toss out the simple round figures?

Strangely enough, there is a simple and logical answer.

There are three factors governing resistances which the designer must consider. First, the heat dissipation, or wattage rating; second, the value of resistance in ohms; and third, the tolerance or leeway from this value permissible in the circuit, expressed as a percentage. This third condition is obviously necessary to enable the manufacturers to bang out resistances by mass production methods and to get away from "selective" assembly. So three standard tolerances have been agreed on, ±5 per cent, which must only be used in exceptional conditions, ±10 per cent, used only where essential, and ±20 per cent, used wherever possible.

A 30000-ohms resistor with a ±10 per cent tolerance can have an actual value between 27000-ohms and 33000-ohms. A 35000-ohms resistor may be between 31500 and 38500-ohms, and a 40000-ohm resistor between 36000 and 44000-ohms. This means that a resistance of 35000-ohms nominal value may have the same actual resistance as a nominal 30000-ohm, or as a nominal 40000 ohms resistance.

(Continued on next page)

Water Question

Try the scenic water route for keeping your vehicle healthy.

ASK Willie how his truck is on oil and he'll likely tell you right off that the old girl has just had a going over and uses none. Gas consumption? — Only fair, Willie might say—gets ten miles on a gallon—but he's getting his carb gone over tomorrow. But ask him his truck's water consumption and he'll likely look at you as if you were a fugitive from the Camel Corps—and no business being around a vehicle park.

Willie, of course, is missing a bet. He's stuck with the idea that because water is free like the waves, it doesn't matter if you have to put a pint in the rad every week or a gallon every day. He's missing the solemn fact that, just as gasoline and oil consumption measure a trucks mechanical condition, so does water consumption.

When you think of it, there's only three ways that water can escape from a cooling system: either it sneaks out the overflow pipe due to the expansion of the water when heated, or the turbulance created by the water pump, *or* it evaporates, *or* it leaks out.

So it's going to use *some* water, of course—just like it's going to use *some* oil. Just how much it uses is the point that tells the story, and this is something that will vary a bit with the conditions a vehicle is working under—and its make and size. What you want is its normal water consumption and to get that is simply a matter of keeping tab of the amount going into the rad over

(Continued on page 200)

RESISTANCE

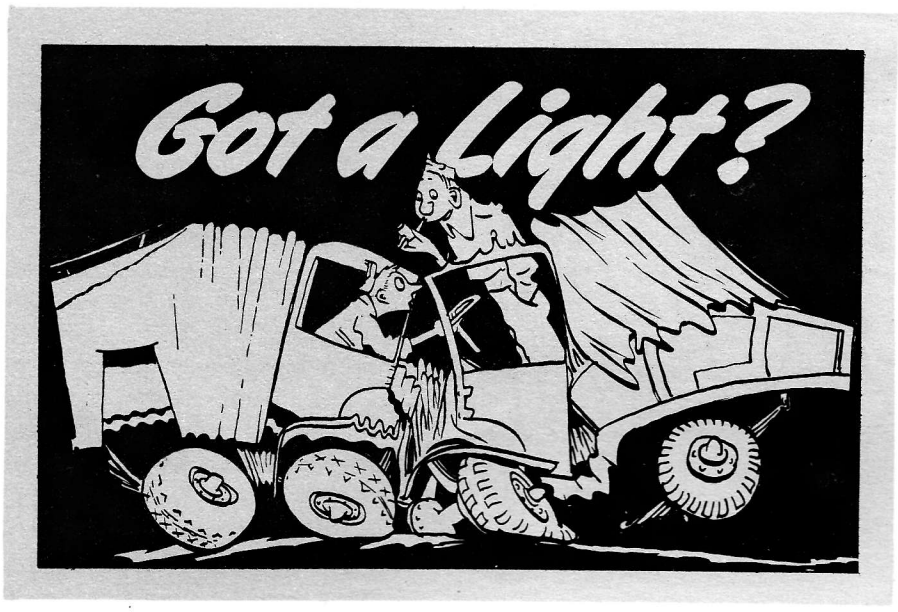
(*Continued from page 194*)

If the same examples are worked out with the ±20 per cent tolerance resistors, there is so much overlapping of values that the 35000-ohm resistor is unnecessary and the range 17600-ohms to 56400-ohms requires only three nominal values, namely, 22000, 33000 and 47000-ohms. This cutting down in the numbers of different values is consequently very considerable. The full range between 10-ohms and 10-megohms is completely covered with 37 nominal values in the ±20 per cent tolerances, 73 nominal values in the ±10 per cent tolerances and 145 nominal values in the ±5 per cent tolerances. (These standard values are shown in the table.)

The wattage rating of resistances depends upon the rate at which the heat generated can be got rid of by way of conduction, convection and radiation. In the majority of wireless sets, (where no forced draught is used), the heat from resistance is lost partly by conduction through the connecting wires and partly by convection currents, the basis of surface area as a function of the wattage; e.g., one square inch of surface for every watt. This is approximately the standard used by English manufacturers. We, however, use a higher temperature rise standard, and our one Watt resistor is roughly the size of an English ½ Watt resistor. In some cases, particularly with our ¼ and ½ Watt resistances, the temperature rises to a point which causes internal changes to occur and the resistance becomes increased in value, or even open-circuited. When this happens—thing to do is replace the resistance with one of equivalent English rating, provided there is room for its extra size. It's clever to decide while you're at it, that the cause of burning out was not due to a short somewhere, and that the resistance was carrying no more than the authorized number of milliamps.

See? Simple and logical—like we said.

X Y Z



"WHY," screamed O'Drool to the Sarge, as he wheeled into the park late last night—"why do those o/oXx$! ! !½½ dim their lights, then throw 'em on the high beam *before* they get past?"

"Take a gander at your own lights!" says the Sarge. O'Drool looked. One shone dimly out at about sea level—the other picked out a sleepy old owl in a nearby tree.

"That," said the Sarge, "is the reason drivers of passing vehicles try to blind you offa the highway. You blind them first with a cockeyed light, then they give you the high beam just to get even."

. . . y'need a bright polight light for a night flight without fright.

You've seen it happen—maybe done it yourself. You've also seen guys playing with dynamite.

For several months you haven't had much use for your headlights. Now, with winter coming up, you'll be depending on your lights again—and what happens. . . . ?

Firstly, the bumps and jars they took during the summer has more than likely spoiled their aim. Chances are, the reflectors are a little on the dullish side. Time has a habit of letting resistance creep into the wiring circuits too, and resistance can be one of the worst enemies of candlepower. A bad wire here, a loose terminal there, and instead of full voltage at the headlights you've only got part of it. Losing 10 percent of the battery voltage doesn't mean a 10 percent drop in candlepower either. Instead, the candlepower falls 30 percent.

So on a six volt system it only takes a loss in the wires and connections of 6/10 of a volt, and the lights are not even three quarters as bright as they could be.

CHECKING FOR VOLTAGE LOSS

With the help of the family voltmeter this is easy and can take but a few minutes. First you check between the ungrounded post of the battery and the headlight bulb, with the lights turned on, which is all quite simple—except for the fact that you can't get at the base of the bulb in a conventional headlamp. That's the reason for the little lamp socket adapter shown in Fig. 1. Doesn't take much time to make and it'll be a boon to any unit garage and workshop. Once the adapter is

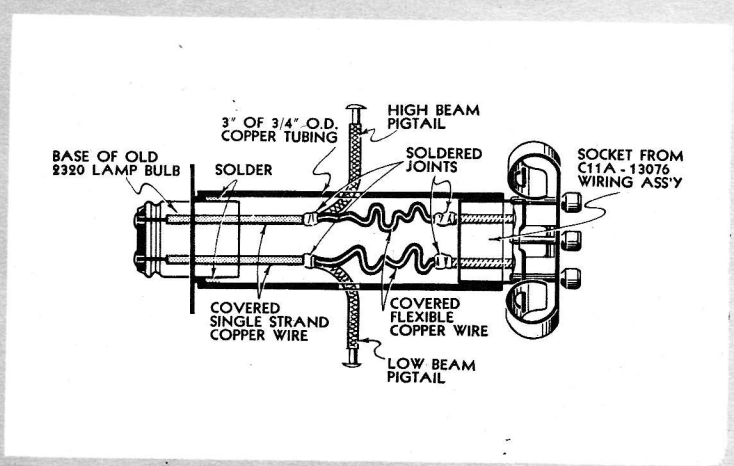


Fig. 1. This open faced adapter lets you make a complete voltage drop check from the battery post to the base of the bulb.

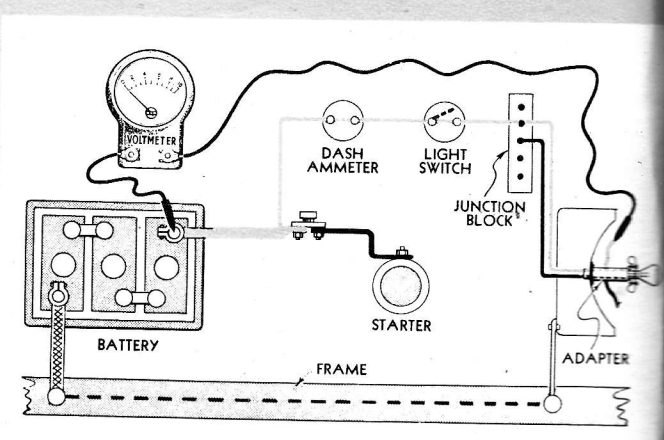


Fig. 2. The high beam hookup that gives a picture of the total resistance in the 'hot' side of the circuit (shown in colour). You get the low beam by flipping the dip switch and testing at the other pigtail.

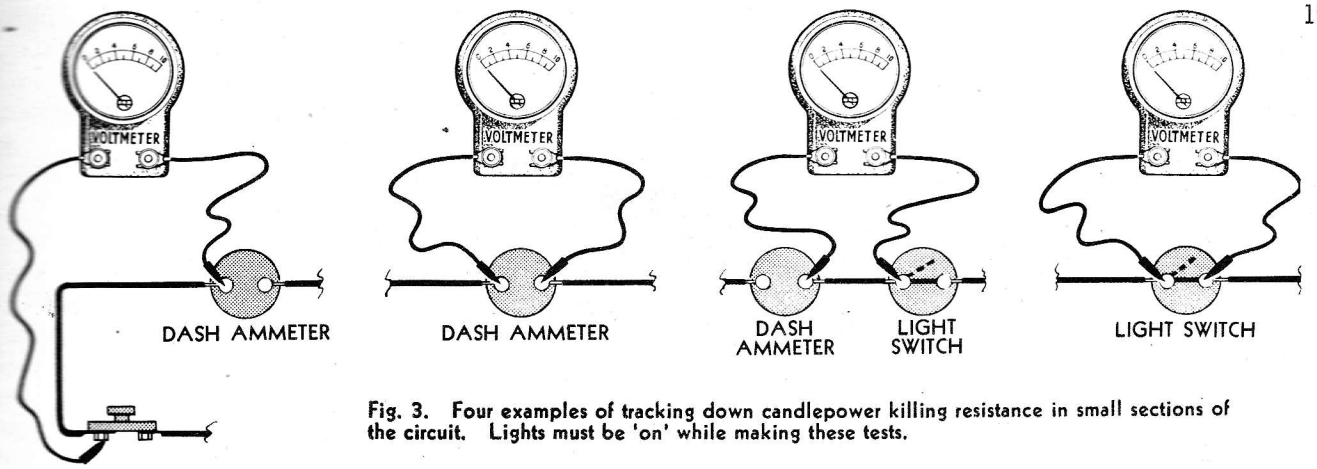


Fig. 3. Four examples of tracking down candlepower killing resistance in small sections of the circuit. Lights must be 'on' while making these tests.

made it's plain sailing. You remove the bulb from the headlight, install the adapter in place of the bulb, then reinsert the bulb in the adapter. One of the adapter's pigtails is for testing the low beam circuit. Switch the lights on *high beam* and clip your test voltmeter to one of the pigtails. The second voltmeter clip goes to the insulated battery post. See Fig. 2. If the voltmeter shoots up to about six volts (on a 6-volt system) you've got the low beam circuit so move the voltmeter clip to the other pigtail.

Now you should get a reading of 3/10 volt or less. A zero reading of course is perfect, but due to the 5 percent allowable loss in the wires we can consider 3/10 as normal. If you get more than that, there's sure to be trouble somewhere in the circuit. The exact location of this trouble can be pin-pointed by testing a small section of the circuit at a time (as we illustrate in Fig. 3). Wherever you get a reading, that's the place where the connections, switches or wiring needs attention.

To check the grounded half of the headlight circuit, connect one test prod of the voltmeter to the *grounded* part of the lamp socket. Connect the other test prod to the grounded battery post (Fig. 4). Now, with the headlamp still burning you should get a *zero* reading on the meter—even a slight reading means resistance and a big drop in candlepower.

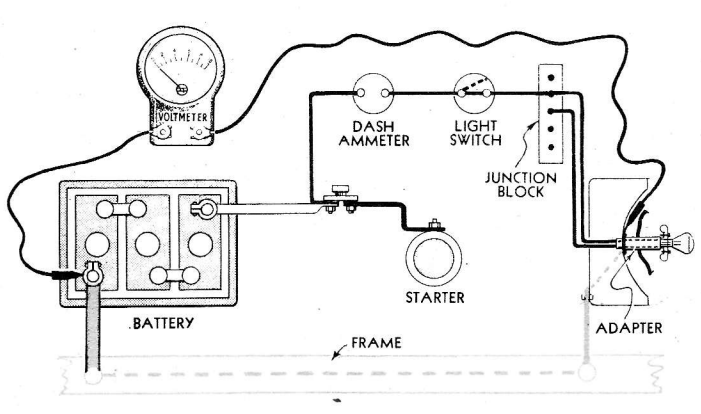


Fig. 4. The ground circuit, where anything more than zero reading is too much. There's only one cause of resistance here—poor connections.

After you've checked and corrected any trouble found in the high beam circuit—do a repeat performance on the low beam. To do this you switch the lights on low beam and use the other pigtail for your voltmeter connection.

When you're satisfied that there's a minimum loss of voltage in both circuits of one head lamp move to the other lamp and check its high and low beam circuits in the same way.

Some vehicles you'll be testing, (jeeps are one example) will be equipped with sealed beam units. To get the connection in their sockets you won't need the adapter. All you do is pull the sealed beam unit partly out of its socket, say ¼ inch, just so you can touch its socket prongs with your test prod while the light is burning. By doing this you can check the voltage loss on high and low beam circuits the same as any other type of headlight.

REFLECTORS

Before replacing the lens on either headlight, look at the reflector. Hey! keep your greasy fingers off it, Jackson. Even the perspiration from your hands isn't good for the mirrored surfaces. If the reflector is tarnished or dull, polish it, but for light's sake, go easy. Use a soft, clean chamois

or piece of soft white cloth saturated with alcohol and a dab of jeweller's rouge. Rub very gently, starting at the centre nearest the socket and work towards the outside edge—follow the arrows in Fig. 5. If you polish in a small circular motion, you'll have it all scratched. If you go at it with button polish, you'll have no reflector.

Finish up the job by polishing in the same gentle manner and direction, using a soft clean piece of dry white cloth. After you've finished you should be able to count your beauty spots in the reflection.

Now install the lens and you are all set to do the last part of the job.

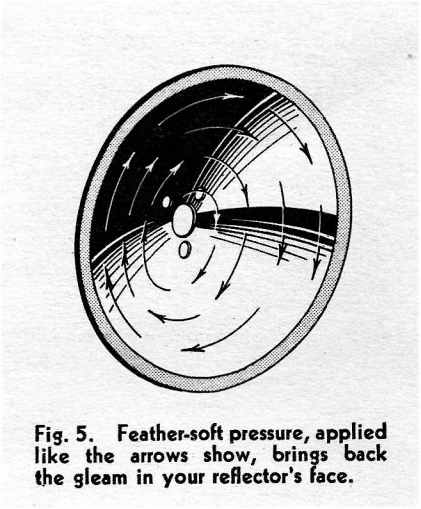


Fig. 5. Feather-soft pressure, applied like the arrows show, brings back the gleam in your reflector's face.

AIMING

For this you'll need an aiming gauge. If you haven't already got one, here's an idea for a universal gauge that can be made from pieces of 1" x 1" or 2" x 1" lumber and three 'U' clamps to hold them together. Set up, it will look like the one in Fig. 6. the three uprights will have to be about six feet long and the horizontal piece, about ten or twelve feet. By slackening the 'U' clamps and moving the strips of wood you can handle anything from bicycles to wreckers.

Lean the aiming gauge on the front of the vehicle, so the centre upright is midway between the two headlights. Now adjust the two outside uprights so they cut through the centre of each lens. Next adjust the horizontal strip so it cuts each headlight lens three inches below centre.

Finding a piece of level floor near a wall may cause a pause but once you've found it, lean the aiming gauge against the wall. The wall should be a light colour. Now back the vehicle up so the face of the headlights are twenty-five feet from the gauge and the centre of the radiator is in line with the centre of the aiming gauge. Turn the lights on the high beam and cover up one light with the Sarge's coat, because we want to do these one at a time. Don't worry about the low beam, if you can get the high beam right the low beam will follow. You'll find two adjustments on the lamp, one up and down and one side to side. Adjust the lamp so the beam sprays a pretty pattern on the aiming gauge like the one in Fig. 6. The centre or hot spot of the beam is right where the pieces cross. When you get it right, black it out with the coat then aim the second lamp in the same way.

If you are unable to get the beam to fall where you want it, check the bulb. Maybe the reflector is loose or the filament has sagged. The remedy would be to tighten the reflector and/or replace the bulb—this goes for sealed beam units as well.

Speaking of sealed beam units, if your vehicle is equipped with these you don't have to worry about cleaning reflectors, all they need is the right number of volts and an accurate aim.

Now you'll see where you're going, come dark, without blinding the daylights out of your little o/oIXx$¼¼ friends and your little o/oIXx$¼¼ friends'll have no excuse for high beaming you!

X Y Z

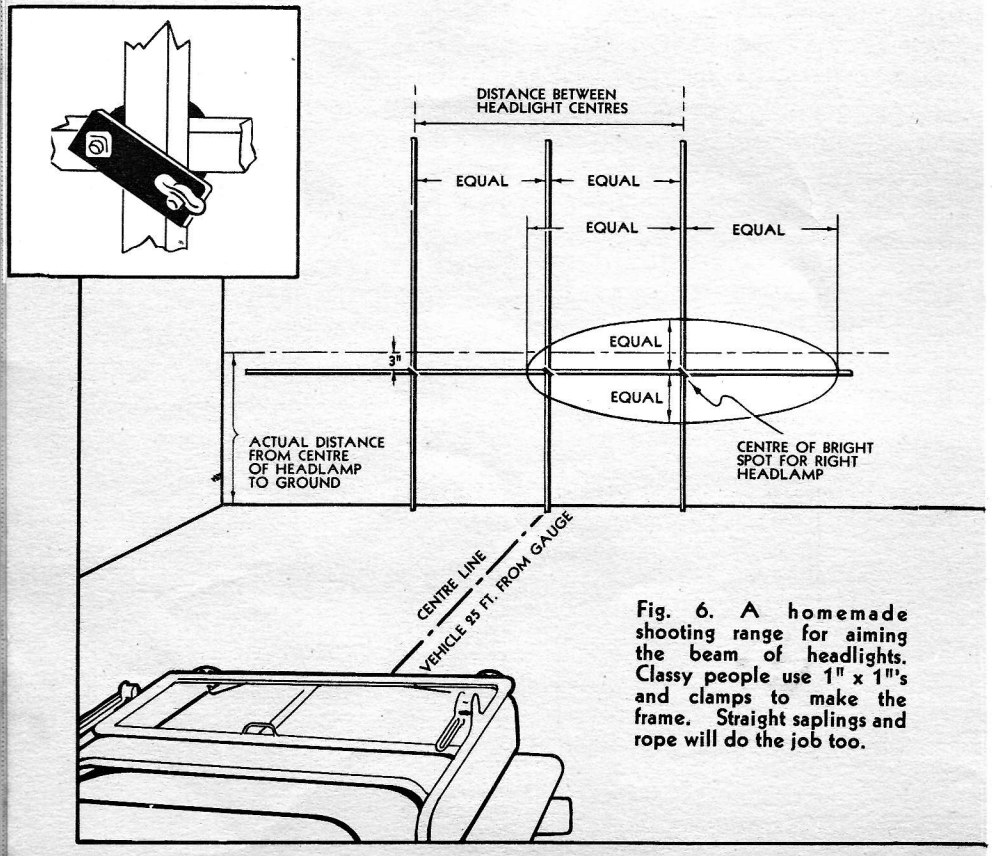


Fig. 6. A homemade shooting range for aiming the beam of headlights. Classy people use 1" x 1"'s and clamps to make the frame. Straight saplings and rope will do the job too.

How about it Dept...

Boots, Boots, Boots

BOOTS will be worn at all times, furthermore, the 'U' joint boots on your Dodges must be in good condition at all times. On a man, poor boots mean bad bunions. On a Dodge poor boots mean bad trunions. That's why it pays you to keep close tabs on the condition of the leather boots on station wagons, staff cars and light trucks using the trunion bearing type 'U' joints.

The sole purpose of the 'U' joint boot is to keep the grease in and the dirt out. Naturally it can't do this if it gets crocked by a rock. An occasional look see then, to check that the boot is ship-shape is a swell idea. This inspection should be made even more frequently if the vehicle is being operated over rocky roads.

The manufacturer tells us that this type of 'U' joint is packed with grease at the time of assembly, and, under ordinary circumstances, no additional lubrication is required for 15,000 miles. So everybody's happy—including the bearings—except it seems that the time interval between lube jobs is so long, some joints *never* get greased—they are completely forgotten.

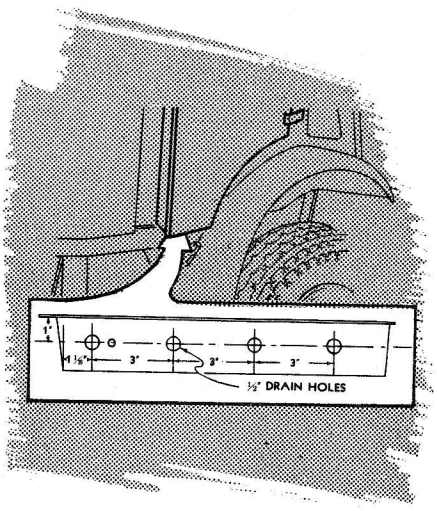
Then there's the over-conscientious lubers. You go to work and overdo it. You stuff grease in there like you were stuffing a turkey. Result—the boot can't take it and bloats up like McTavish's bagpipes. After that the grease gets out and the dirt gets in, which is exactly what you don't want to happen.

The right way to lube these joints is to take them apart, wash out all the old grease and dirt, then repack the body of the joint with fresh D.N.D. 672.

Then, unless your vehicle is operating under extremely dusty dirty conditions the joint will be set for another 15 thousand.

Not Mice - Poor Drainage

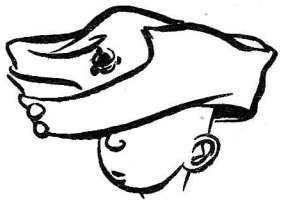
THERE'S always something coming up to make your happy life miserable. You're driving along in the rain, high, dry and comfortable, listening to the swish swish swish of your wipers. Then a gurgling sound reaches your shell-like ears. Being a good driver you're allergic to unusual noises. You wonder if there's three fathoms of sea water between you and the highway.



There's no need to get out your water wings; instead, check the drainage system of the cab doors. You'll probably find only one 5/16" hole—and you'll also probably find it's pretty well plugged with dirt and rust. Hence the reason for toting around anywhere from a pint to a gallon of rain in the cab door.

(Continued on page 200)

WHAT'S YOUR CURRENT I.Q.?



TRY these over your ears for size. After you've ticked off what you think is true and what you think is false—flip to the next page and see what pay you should be getting. Then go see the paymaster (but don't say we sent you).

10 correct — you're a genius — a dollar a year man.
9 right — a top-notch private.
8 right — a colonel with trades pay.
5 right — a half-genius.
Below 5 — either a sergeant, or lance-wit, depending on the arm of service.

	True	False
1. Oil is not an insulator.	☐	☐
2. Arcing will increase brush wear.	☐	☐
3. Loose connections between the generator and battery will cause low generator voltage.	☐	☐
4. Loose connections in the field circuit will cause low charging rate.	☐	☐
5. A tight fan belt can damage the generator.	☐	☐
6. Dirty connections can cause a generator to burn up.	☐	☐
7. Fine emery cloth should be used to polish the commutator.	☐	☐
8. High voltage will blow fuses.	☐	☐
9. To check maximum output on a Ford generator you short the field terminal to ground.	☐	☐
10. A fully charged battery will cause the current regulator to operate.	☐	☐

How About It Dept.

(*Continued from page 199*)

Apart from the annoying gurgling sound—is this bad? It sure is. If the water slops around in there for long you'll have only part of a door. Rust will eat through the panel till it looks like an old cheese box after a mouse's picnic.

Latest word from G.M. tells us that vehicles now rolling off the line have four ½" holes—making for better drainage. That's good news but what about the vehicle you're driving now?

We suggest you do the same as G.M. Take yourself a ½" drill and bore four larger holes instead of the one small hole. Space them like we show.

Then, come rain or high water —damp rot isn't going to powder away your doors to rust dust.

X Y Z

Water Works

(*Continued from page 195*)

a period of time—say a week. If a truck is operating at about the same temperature each day, the amount of water loss should remain constant and compare with the average for all the similar type vehicles of the unit. Any appreciable increase in its standard drinking habits then will give you cause to stop, look, and start nosin' around for the reason.

Where you going to nose? All the obviously possible points of leakage are a good start—the radiator core and tanks—the drain cocks, hose connections, water pump, frost plugs.

A high engine temperature will bring about more rapid loss of water and should cause you to suspicion the thermostat, a non-operating water pump, ignition or valve timing, carboned up engine, clogged rad, and clogged or kinked exhaust system (make sure you still have a fan belt too).

If you can find no reason to suspect the plumbing and the engine's temperature is normal, yet it's still a heavy drinker, better take a quick check on the oil. The water must be going somewhere and chances are it's finding its way into the crankcase by way of a crack in the head or block—or a blown head gasket.

Even Willie will admit that this is a most unhappy condition (and one that had him thinking he was using no oil).

Yeh, watering time for the trucks can tell a story of good or bad goings on under the hood. Even tho' it's free, wise guys keep a tight-fisted watch on how much water goes into the filler hole.

X Y Z

Ten Comebacks to the 10 Quiztions on Page 199

1. FALSE—Oil is classed as an insulator, that is, it's a dielectric or nonconductor of electrical current. If oil gets on the generator commutator, which it often does if the bearings are overlubricated, there'll be little or no generator output.

2. TRUE—Arcing will definitely shorten the life of generator brushes and sooner or later may cause the solder to throw from the commutator bars causing the armature to become open circuited.

3. FALSE—Loose connections in the charging circuit will cause high generator voltage. Due to the resistance of the loose connection, more current will flow through the fields which in turn increases the voltage in the armature windings.

4. TRUE—Any condition that increases the resistance in the field circuit reduces the current flow through the fields—decreasing the charging rate.

5. TRUE—A tight fan belt puts heavy strains on generator bearings, wears them out, can end up in damage and breakage for armature and field coils.

6. TRUE—Dirty connections, the same as loose connections, can cause the current and voltage within the generator to go sky high. The generator ends up looking like another log on the fire.

7. FALSE—Emery cloth should *never* be used to clean or polish the commutator. Particles of emery are conductors and if they lodge between the commutator bars can cause a short. Crocus cloth or fine (00) sandpaper is the old standby. It's smart to blow the commutator off after—regardless of which you use.

8. FALSE—High voltage all by its lonesome can't blow a fuse. The fuse is there to protect the circuit against too high amperage. Usually high current is caused by an accidental ground or short but sometimes a high voltage condition can be the reason for too many amps in a circuit.

9. FALSE—To check maximum output of Ford two-brush generators connect the field terminal to the armature or main brush terminal using a jump wire. The field circuit is grounded inside the generator on these jobs. Grounding the field terminal outside the generator just shorts out the fields and there'll be no charge at all.

10. FALSE—The only thing that causes the current regulator to operate is the little amps coming from the generator. When the generator charges too high, the current regulator holds the current down. But when the battery becomes fully charged it's the *voltage* regulator that goes to work.

Acq # wm 1981-597/61

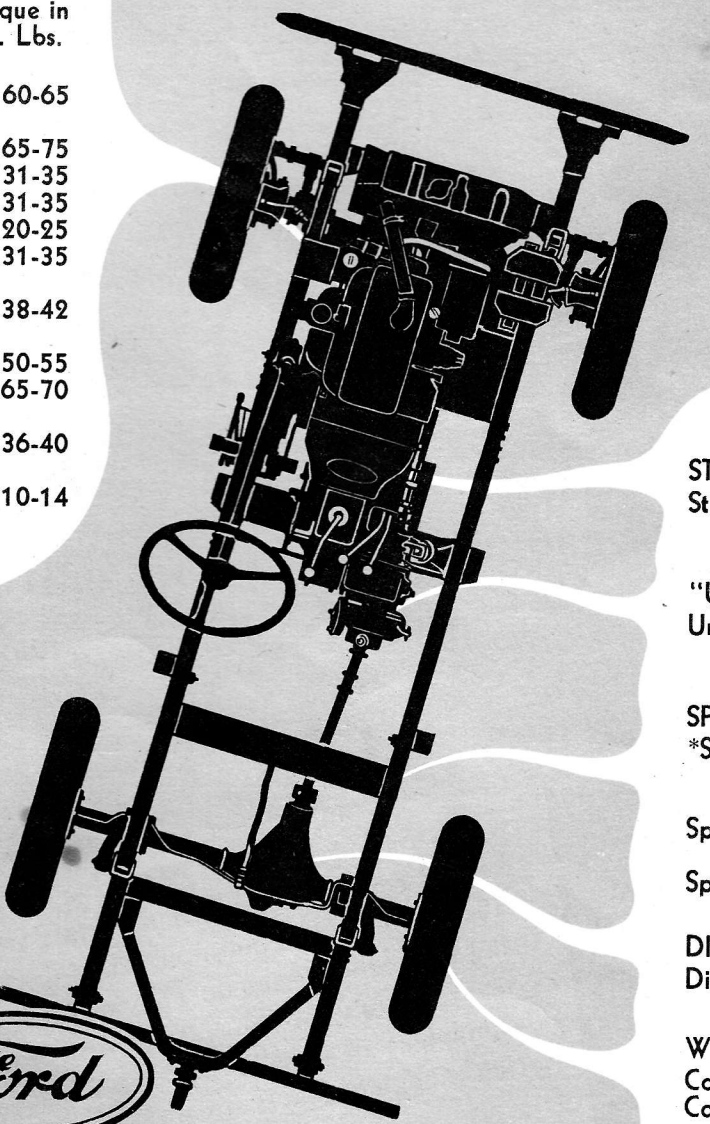
Wrench Muscle Specs

A LITTLE matta of having the data saves a heap of chatta. So we bring you the second helping of torque specs. This time it's the latest torques on Jeeps.

If you're still on speaking terms with your private secretary maybe she'll type a copy of these figures so you can pin them up on the wall along side G.M.'s which we gave you last month. Or—like we said before, in cases of dire necessity you might even paste up this cover.

Foot Pounds of Torque with threads clean and dry. If threads are cleaned and oiled, applied torque should be reduced about 10%. Ford and Willys ¼-4 x 4 Models—MA & MB

ENGINE	Torque in Ft. Lbs.
Cylinder Head Stud Nuts	60-65
Cylinder Head Screws	65-75
Exhaust Manifold	31-35
Intake Manifold	31-35
Starter	20-25
Generator (Bracket)	31-35
Engine Mounting (Center Bolt)	38-42
Connecting Rod Bearing Bolts	50-55
Main Bearing Caps	65-70
Flywheel to Crankshaft	36-40
Oil Pan Screws to Cylinder Block	10-14



WILLYS Ford

STEERING	
Steering Mounting to Frame	36-40
"U" JOINTS	
Universal Joints ("U" Bolts)	15-18
SPRINGS	
*Spring Mounting—Front ("U" Bolts)	50-55
L.H.	60-65
Spring Mounting—Rear ("U" Bolts)	50-55
Spring Pivot Bolts	27-30
DIFFERENTIAL	
Differential Carrier	38-42
WHEELS	
Combat Wheels	60-70
Combat Wheel to Hub	60-70

*(*R.H. Only—L.H. to be 60—65 when Torque Reaction Spring is used*).

D' war's in da bag ain't it?

Dat 'quipment dey got me monkeyin' round wif ain't gonna mean nuttin' no more. Maint-'nance don't mean nuttin' to me no more! Nuttin' means nuttin' no more! So "do nuttin'" s'me motto from now on. Let the contrapshuns fall apart if dey wantsta. Besides, do I look like a sucker wots gonna work me head to da bone, tryin' t' keep dat stuff in da pink for some udder guy?★

★The editors regret that no prizes are offered for the answer to this question. They also regret knowing the character above. They regret that he doesn't realize there's a billion dollars worth of war working equipment in Canada - and we Canadians are not rich enough to toss it down the drain.